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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/549,285	09/16/2005	Kazuyoshi Yamazaki	278536US26PCT	2471
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OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314				
EXAMINER				
CHEN, KEATH T				
ART UNIT		PAPER NUMBER		
1792				
NOTIFICATION DATE		DELIVERY MODE		
02/15/2008		ELECTRONIC		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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**Office Action Summary****Application No.**

10/549,285

**Applicant(s)**

YAMAZAKI ET AL.

**Examiner**

KEATH T. CHEN

**Art Unit**

1792

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 20 December 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) 9-30 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/ISD)
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date: \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_
- Paper No(s)/Mail Date 12/15/2005

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Applicant's election of Group I, claims 1-8 in the reply filed on December 20, 2007 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. Claims 1-2 and 4-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sano et al. (US 6407405, hereafter '405), in view of Boydston et al. (US 6375749, hereafter '749).

5. '405 teaches some limitations of:

1. Claim 1: A substrate processing apparatus (Fig. 1) comprising: a processing vessel (chamber #1, col. 3, line 3) forming a processing space; a supporting table (substrate holder, #3,

col. 3, line 27) for supporting a substrate (S) to be processed in the processing space; a nitrogen radical generation unit (#41, col. 3, lines 53-55), provided at an end portion of the processing vessel at a first side (lower side of Fig. 1) of the supporting table, for forming nitrogen radicals by a high frequency plasma (RF, col. 3, line 55) and supplying the nitrogen radicals into the processing space, the nitrogen radicals flowing along a surface of the substrate to be processed from the first side to a second side (label "P", vacuum pump #2, col. 3, line 4), the second side facing the first side with the substrate to be processed placed therebetween (S is between #41 and pump "P"); an oxygen radical generation unit (#31, col. 3, lines 48-51), provided at the end portion at the first side (lower side of Fig. 1), for forming oxygen radicals by a high frequency (RF, col. 3, line 51) plasma and supplying the oxygen radicals into the processing space, the oxygen radicals flowing along the surface of the substrate to be processed from the first side to the second side; and a gas exhaust path (pump "P"), provided at an end portion at the second side (the upper side of Fig. 1), to exhaust the processing space, wherein the nitrogen radicals and the oxygen radicals flow towards the gas exhaust path from the nitrogen radical generation unit and the oxygen radical generation unit while forming a nitrogen radical flow path (a line connecting the center of #41 to the center of S) and an oxygen radical flow path (a line connecting the center of the #31 to the center of S) along the surface of the substrate (the substrate S will bend the gas path along the surface of the substrate) as to be processed, respectively.

2. Claim 2: The substrate processing apparatus of claim 1, wherein the nitrogen radical generation unit includes a first gas passageway (nitrogen flows within #41, col. 3, line 59) and a first high frequency plasma generation unit (not shown; column 3; lines 53-56) formed at a part of the first gas passageway to excite a nitrogen gas passing therethrough into a plasma (col. 3,

line 53); and the oxygen radical generation unit includes a second gas passageway (oxygen flows within #31, col. 3, line 57) and a second high frequency plasma generation unit (not shown; column 3; lines 49-52) formed at a part of the second gas passageway to excite an oxygen gas passing therethrough into a plasma (col. 3, line 48), wherein the first and the second gas passageway are in communication with the processing space (as shown in Fig. 1).

Claim 4: The substrate processing apparatus of claim 1, wherein the nitrogen radical generation unit is installed to allow the distance between a center (any center) of the nitrogen radical flow path and that of the substrate to be processed to be 40 mm or less.

Applicant's claim requirements amount to an intended use of the pending apparatus claims. The claimed "distance" is a function of the substrate's geometry. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter, 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto, 136 USPQ 458, 459 (CCPA 1963); MPEP2111.02).

3. Claim 5: The substrate processing apparatus of claim 1, wherein the oxygen radical generation unit is installed to allow the distance between a center of the oxygen radical flow path and that of the substrate to be processed to be 40 mm or less.

Applicant's claim requirements amount to an intended use of the pending apparatus claims. The claimed "distance" is a function of the substrate's geometry. Further, it has been held

Art Unit: 1792

that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter, 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto , 136 USPQ 458, 459 (CCPA 1963); MPEP2111.02).

4. Claim 6: The substrate processing apparatus of claim 1, wherein a center of the nitrogen radical flow path intersects with that of the oxygen radical flow path substantially at a center of the substrate to be processed (as shown in Fig. 1. Furthermore, with the manipulator #7 that changes the position of substrate holder #3, see col. 3, lines 31-32, the apparatus is capable of).

Applicant's claim requirements amount to an intended use of the pending apparatus claims. The claimed "at a center of the substrate to be processed" is a function of the substrate's placement in the reactor as well as the substrate's geometry. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter, 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto , 136 USPQ 458, 459 (CCPA 1963); MPEP2111.02).

5. Claim 7: The substrate processing apparatus of claim 1, wherein there is provided a flow adjusting plate (shutter S4, col. 3, lines 24-25, is capable of interfering flow) interfering with the nitrogen radical flow path to change a direction thereof.

6. Claim 8: The substrate processing apparatus of claim 1, wherein there is provided a flow adjusting plate (shutter S3, col. 3, lines 19-20) interfering with the oxygen radical flow path to change a direction thereof.

7. '405 does not teach the other limitations of:

8. Claim 1: a rotatable supporting table; a rotation mechanism of the supporting table.

9. '749 is an analogous art in the field of semiconductor fabrication (field of the invention; '405 field of the invention), particularly in growing of an epitaxial layer (col. 2, lines 61-63, '405, col. 5, line 48). '749 teaches a rotation and translation mechanism (not shown, col. 5, lines 13-17) to substrate support shaft (Fig. 3 #82).

10. At the time the invention was made, it would have been obvious to a person having ordinary skill in the art to have added rotation mechanism, as taught by '749, to drive the substrate holder (#3) in Fig. 1 of '405.
11. The motivation would have been evenly distributing reactants ('749, col. 5, lines 17-19).
12. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over '405 and '749, in view of Anders (US 20020000779, hereafter '779).
13. '405 and '749, together, teach all limitations of claim 1, as discussed above.
14. '405 and '749, together, do not teach the limitation of claim 3:
15. The substrate processing apparatus of claim 1, wherein the nitrogen radical flow path and the oxygen radical flow path are substantially parallel to each other.
16. '779 is an analogous art in the field of semiconductor processing ([0004] '405 field of the invention), particularly in array of plasma (field of the invention). '779 provides a parallel array of plasma (Fig. 9).

17. At the time the invention was made, it would have been obvious to a person having ordinary skill in the art to have consolidated various plasma sources in Fig. 1 of '405 into a parallel array of plasma, as taught by '779.

18. The motivation would have been for a compact small diameter source design ('779, [0046]).

### *Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KEATH T. CHEN whose telephone number is (571)270-1870. The examiner can normally be reached on M-F, 8:30-5:00 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Cleveland can be reached on 571-272-1418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Art Unit: 1792

/K. T. C./

Examiner, Art Unit 1792

/Rudy Zervigon/

Primary Examiner, Art Unit 1792